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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,246	01/25/2001	Kazushi Higashi	2001_0055	3700

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WENDEROTH, LIND & PONACK, L.L.P.
2033 K STREET N. W.
SUITE 800
WASHINGTON, DC 20006-1021

EXAMINER

PAREKH, NITIN

ART UNIT PAPER NUMBER

2811

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/768,246

Applicant(s)

HIGASHI ET AL.

Examiner

Nitin Parekh

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12, 13 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12, 13 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12 & 13.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The Information Disclosure Statements filed on 11-21-02 and 04-03-03 have been considered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12, 13 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khandros et al. (US Pat. 5917707).

- A. Regarding claim 12, Khandros et al. disclose a semiconductor arrangement (401 in Fig. 25) comprising:

- a bump electrode/contact structure (418 in Fig. 25; 138/137a/137b/139 in Fig. 3) having a U-shape protruded structure including a plurality of protrusions/bends including a first protrusion and a second protrusion (not numerically referenced in Fig. 25, see the protrusions/bends at corners of U-shape; see first, second and third protrusions/bends 138/137a, 137b and 143, etc. in Fig. 3) and bonded to an

- integrated circuit (IC)/semiconductor element electrode/pad (not numerically referenced in Fig. 25, see 103 in Fig. 1-3) on a circuit forming surface of the IC
- the first and second protrusions being in contact and being close to an electrode/pad on a printed circuit board/PCB (412/413 on 411 in Fig. 25) when the IC element is mounted on the PCB, and
- the first protrusion having a formed portion (not numerically referenced in Fig. 25, see 138 in Fig. 3) and a wire material portion comprising a portion of the wire in the vicinity of the formed portion (418 in Fig. 25, 137a in Fig. 3), the wire portion extending from a vertex/tip portion (not numerically referenced in Fig. 25, see tip portion of 138 in Fig. 3) of the formed portion downward/sideways from the vertex portion and being bonded to the formed portion, where the wire portion does not contact the IC electrode or the circuit forming surface

(Fig. 25 and 3; Col. 16, lines 60-65; Col. 7, lines 18-45).

B. Claim 12 does not distinguish over Khandros et al. regardless of a process for forming the formed portion of the first protrusion by forming the melted portion of wire with a capillary and solidifying the melted portion, because only the final product is relevant, not the process of making such as “melting and solidifying or stamping or pressing”. Note that a “product by process” claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324;

In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marrosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

Regarding claim 13, Khandros et al. teach substantially the entire claimed structure as applied to claim 12 above, and further teach the electrode on the PCB and the IC bump electrode being electrically connected to each other (Fig. 25; Col. 17, lines 1-15).

Regarding claim 21, Khandros et al. teach substantially the entire claimed structure as applied to claim 12 above, and further teach:

- a variety of configurations of the protrusions of the IC bump electrode being connected to the pads/conductors on the PCB (see 418 in Fig. 25 and protrusions 467b at top surface and within through-hole conductor in an embodiment of Fig. 28; Col. 17, lines 1-15; Col. 18, lines 21-41), and
- using a conductive material such as a solder or a conductive epoxy/adhesive (Col. 21, line 47) to connect the electrode on the PCB, and

Regarding claim 22, Khandros et al. teach substantially the entire claimed structure as applied to claim 12 above, and further teach the embodiment in Fig. 28 where the vertex/tip portions of the first and second protrusions have portions with flat surfaces (see protrusions 467b at top surface and within through-hole conductor in Fig. 28 having flat portions connecting the respective flat pad/through-hole electrode surfaces; Col. 18, lines 21-41).

Regarding claim 23, Khandros et al. teach substantially the entire claimed structure as applied to claims 12 and 22 above, and further teach embodiments incorporating a variety of electrode configurations having the plurality of protrusions/bends such that the protrusions/bends (137a, 137b, 143, etc. in Fig. 3) have different shapes/patterns (U-shape, S-shape, etc. in Fig. 3, 24, 34, 38, etc.) and those can be bonded at desired dimensions such as height, depth or spacing from the bump electrode to provide desired resiliency and conductance (Col. 7, 16, 17 and 21).

Regarding claim 24, Khandros et al. teach substantially the entire claimed structure as applied to claim 12 above, and further teach the second protrusion being formed from a portion of the wire extending upward from the formed portion (see 143 in Fig. 3; Col. 7, line 15-45).

Response to Arguments

4. Applicant's arguments with respect to claims 12, 13 and 21-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nitin Parekh whose telephone number is 703-305-3410. The examiner can normally be reached on 09:00AM-05:30PM.

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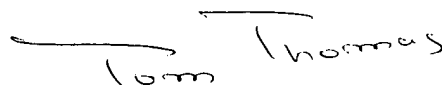
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Nitin Parekh

NP

06-12-03


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800